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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/820,632	04/08/2004	Robin Pierce Gardner	5051-631	8467

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EXAMINER	
BAKER, DAVID S	

ART UNIT	PAPER NUMBER
2884	

DATE MAILED: 04/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

H-0

Office Action Summary	Application No.	Applicant(s)	
	10/820,632	GARDNER, ROBIN PIERCE	
	Examiner	Art Unit	
	David S. Baker	2884	

– The MAILING DATE of this communication appears on the cover sheet with the correspondence address –

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 April 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *08 April 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *9/24/04, 12/20/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609.04(a) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 3-4, 6-12, 15-16, 18-22, and 25 are rejected under 35 U.S.C. 102(b) as being anticipated by Meyerhof (US Patent 3,041,455 A).

Regarding claim 1, Meyerhof discloses a gamma ray detector assembly for placement in a logging tool in a borehole, the detector assembly comprising: a first gamma ray detector (crystal 30, figure 1, figure 2) elongated along an axis and defining a void extending along the axis (column 2 lines 66-72, column 3 lines 1-6); and a second gamma ray detector (crystal 20, figure 1, figure 2) conforming to at least a portion of the void (column 2 lines 66-72, column 3 lines 1-6), wherein the first and second gamma ray detectors are configured to be positioned in the borehole (figure 1, column 1 lines 10-22).

Regarding claim 3, Meyerhof discloses that the first gamma ray detector and the second gamma ray detector are scintillation detectors (column 2 lines 35-37, column 6 lines 20-26).

Regarding claim 4, Meyerhof discloses that the first and second gamma ray detectors are cylindrical, the first gamma ray detector forms an outer cylinder and the second detector forms an inner cylinder (figure 2, column 2 lines 66-72, column 3 lines 1-6).

Regarding claim 6, Meyerhof discloses that a shielding material (bismuth shielding 16, boron shielding 48, figures 1 and 2) is on the lower end of the first gamma ray detector (column 3 lines 29-47 and 67-73) and a radioactive neutron source (neutron source 15, figure 1) on a side of the shielding material facing away from the first gamma ray detector (figure 1, column 3 lines 29-47 and 67-73), wherein the radioactive source is configured to irradiate material in the borehole (column 3 lines 29-47).

Regarding claim 7, Meyerhof discloses a first photomultiplier tube (photomultiplier tube 31, figure 1) in communication with the first gamma ray detector (crystal 30, figure 1, figure 2) and a second photomultiplier tube (photomultiplier tube 21, figure 1) in communication with the second gamma ray detector (crystal 20, figure 1, figure 2).

Regarding claim 8, Meyerhof discloses a signal processor (preamplifiers 22 and 32, amplifiers 23 and 33, discriminator 34, gating circuit 35, pulse analyzer 36, recorder 37, and depth indicator 38, figure 1) configured to receive signals from the first and second gamma ray detectors (column 4 lines 14-40).

Regarding claim 9, Meyerhof discloses that the signal processor is configured to detect a first event in one of the first gamma ray detector and the second gamma ray detector and to determine if a second event is detected in coincidence with the first event in the other of the first and second gamma ray detectors (column 4 lines 14-40).

Regarding claim 10, Meyerhof discloses that the signal processor is configured to determine the rate of coincidence between an event in one of the first and second gamma ray detectors and an annihilation photon in the other of the first and second gamma ray detectors (figure 3, column 3 lines 74-75, column 4 lines 1-40).

Regarding claim 11, Meyerhof discloses that the signal processor is configured to determine the rate of coincidence between an event and two annihilation photons (figure 3, column 3 lines 74-75, column 4 lines 1-40).

Regarding claim 12, Meyerhof discloses that the signal processor is configured to determine the rate of coincidence between a first event and a second event, wherein the first event and the second event sum to a predetermined energy (figure 3, column 3 lines 74-75, column 4 lines 1-40).

Regarding claim 15, Meyerhof discloses a method of detecting gamma rays in a borehole, the method comprising: placing a first gamma ray detector (crystal 30, figure 1, figure 2) and second gamma ray detector (crystal 20, figure 1, figure 2) into the borehole (column 1 lines 10-22), wherein the first gamma ray detector is elongated along an axis and defines a void extending along an axis (column 2 lines 66-72, column 3 lines 1-6) and the second gamma ray detector conforms to at least a portion of the void (column 2 lines 66-72, column 3 lines 1-6); detecting a first event in one of the first gamma ray

detector and the second gamma ray detector (column 4 lines 14-40); and determining whether a second event is detected in coincidence with the first event in the other of the first gamma ray detector and the second gamma ray detector (column 4 lines 14-40).

Regarding claim 16, Meyerhof discloses that the first and second gamma ray detectors are cylindrical, the first gamma ray detector forms an outer cylinder and the second detector forms an inner cylinder (figure 2, column 2 lines 66-72, column 3 lines 1-6).

Regarding claim 18, Meyerhof discloses positioning shielding material (bismuth shielding 16, boron shielding 48, figures 1 and 2) on the lower end of the first gamma ray detector (column 3 lines 29-47 and 67-73) and positioning a radioactive source (neutron source 15, figure 1) on a side of the shielding material facing away from the first gamma ray detector (figure 1, column 3 lines 29-47 and 67-73), and irradiating material in the borehole with the radioactive source (column 3 lines 29-47).

Regarding claim 19, Meyerhof discloses providing a first photomultiplier tube (photomultiplier tube 31, figure 1) in communication with the first gamma ray detector (crystal 30, figure 1, figure 2, column 2 lines 35-65) and a second photomultiplier tube (photomultiplier tube 21, figure 1) in communication with the second gamma ray detector (crystal 20, figure 1, figure 2, column 2 lines 35-65).

Regarding claim 20, Meyerhof discloses determining whether a second event is detected in coincidence with the first event includes determining the rate of coincidence between an event in one of the first and second gamma ray detectors and an annihilation

photon in the other of the first and second gamma ray detectors (figure 3, column 3 lines 74-75, column 4 lines 1-40).

Regarding claim 21, Meyerhof discloses determining whether a second event is detected in coincidence with the first event includes determining the rate of coincidence between an event and two annihilation photons (figure 3, column 3 lines 74-75, column 4 lines 1-40).

Regarding claim 22, Meyerhof discloses determining whether a second event is detected in coincidence with a first event includes determining the rate of coincidence between a first event and a second event, wherein the first event and the second event sum to a predetermined energy (figure 3, column 3 lines 74-75, column 4 lines 1-40).

Regarding claim 25, Meyerhof discloses a method of detecting gamma rays in a borehole comprising: placing a first gamma ray detector (crystal 30, figure 1, figure 2) and second gamma ray detector (crystal 20, figure 1, figure 2) into the borehole (column 1 lines 10-22); detecting a first event in one of the first gamma ray detector and the second gamma ray detector (column 4 lines 14-40); and determining whether a second event is detected in coincidence with the first event in the other of the first gamma ray detector and the second gamma ray detector (column 4 lines 14-40).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Meyerhof (US Patent #3,041,455 A) in view of Spurney (US Patent #4,764,677 A).

Regarding claim 2, Meyerhof discloses all the limitation of claim 1, but does not disclose expressly that the gamma ray detector assembly further comprises a substantially waterproof housing enclosing the first gamma ray detector and the second gamma ray detector. Spurney discloses a well logging crystal scintillation detector where the detectors are enclosed in a dry box to prevent exposure to moisture and the crystals are enclosed in hermetically sealed metal container or housing (housing 10, window assembly 13, peripheral welds 17 and 18, figure 1, column 1 lines 21-33). At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to enclose the detectors and crystals of Meyerhof within the hermetically sealed housing of Spurney. The motivation for doing so would be to protect the detectors from moisture that would be detrimental to their operation as describe by Spurney (column 1 lines 21-33).

6. Claims 5 and 17 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Meyerhof (US Patent 3,041,455 A).

Regarding claim 5, Meyerhof discloses that the scintillation crystals may have various geometrical cross-section configurations including a cylinder, a square, a polygon, etc. (column 6 lines 8-13). Therefore, Meyerhof teaches a first gamma ray detector having a variable thickness around the perimeter of the second gamma ray detector. Alternatively, it would have been obvious to use a crystal of variable thickness

to conform to the overall shape of the detector housing to increase the likelihood that the scintillator crystal is properly secured within the housing.

Regarding claim 17, Meyerhof discloses that the scintillation crystals may have various geometrical cross-section configurations including but a cylinder, a square, a polygon, etc. (column 6 lines 8-13). Therefore, Meyerhof teaches a first gamma ray detector having a variable thickness around the perimeter of the second gamma ray detector. Alternatively, it would have been obvious to use a crystal of variable thickness to conform to the overall shape of the detector housing to increase the likelihood that the scintillator crystal is properly secured within the housing.

7. Claims 13-14 and 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Meyerhof (US Patent 3,041,455 A) in view of McKeon (US Patent #4,937,446 A).

Regarding claims 13 and 23, Meyerhof discloses all the limitations of claim 12, but does not disclose expressly that the predetermined energy is between about 1.5 MeV and 11 MeV. McKeon discloses that is a common purpose of well logging to establish the fraction of pore space occupied by hydrocarbons by determining the carbon to oxygen ratio based on high energy neutron scattering (column 1 lines 20-34). The high-energy scattering values disclosed by McKeon are 4.438 MeV for gamma rays scattered from carbon and 6.1 MeV for gamma rays scattered by oxygen (column 1 lines 35-51). At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to search for predetermined energies between 1.5 MeV and 11 MeV. The motivation for doing so is given by McKeon when he states that the gamma ray energy

values for carbon and oxygen scattering are within this range and that the determination of the carbon to oxygen ratio is the major goal of well logging.

Regarding claim 14, Meyerhof discloses all the limitations of claim 8, but does not disclose expressly that the signal processor is further configured to determine a ratio of oxygen and carbon based on the events in the first and second gamma ray detectors. McKeon discloses a signal processor (electronics 24, telemetry 28, surface instrumentation 30, figure 1) configured to determine a ratio of oxygen and carbon based on the events in gamma ray detectors (column 7 lines 10-68, column 8 lines 1-33).

Regarding claim 24, Meyerhof discloses all the limitations of claim 15, but does not disclose expressly determining the ratio of oxygen and carbon based on the events in the first and second gamma ray detectors. McKeon discloses determining a ratio of oxygen and carbon based on the events in gamma ray detectors (column 7 lines 10-68, column 8 lines 1-33).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David S. Baker whose telephone number is 571-272-6003. The examiner can normally be reached on MTWRF 10:30-7:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David P. Porta can be reached on 571-272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

David S Baker
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